

## BOOK REVIEWS

ASPECTS OF STONE WEATHERING, DECAY AND CONSERVATION edited by Melanie S. Jones and Rachael D. Wakefield, Imperial College Press, London 1999. No. of pages: 196. Price £26.00. ISBN 1 86094 131 1

Twenty-two chapters cover papers presented at an Aberdeen conference in May 1997 arising from British Geomorphological Research Group support for the stone Weathering and Atmospheric Pollution Network (SWAPNET). Three are short poster abstracts and two are short presentation abstracts. There is no overall theme, but given the location of the conference, it is not surprising that seven papers emphasize Scottish locations.

The scientific findings include the importance of protective crusts in preserving the stone underneath; the role of redox reactions as well as acid base reactions; the importance of moisture in salt cycles; the significant of colonization by algae, fungi and lichens; the variation in the rates of soiling by algae and other agents (6–22 years); and progress on the interaction between various biological and non-biological agents.

What is abundantly clear is how stone weathering studies have swung away from natural environments (and even limestone weathering) to applied topics – perhaps following the funding opportunities. In various combinations of topics, eight papers focus on buildings, five on monuments and gravestones and three on cleaning techniques. Two are concerned with salts, two with algae, one with microclimate and only one with SO<sub>2</sub>. Six papers focus on sandstone, two on limestone and one on granite. Perhaps as a further sign of the times, one paper focuses on paying for upkeep and restoration, asking ‘how much would you pay for Durham

Cathedral?’. Interestingly, there is also a shift from using the study of artefacts, monuments and buildings as a means of elucidating how rocks weather to an interest in the actual constructions themselves. The study of stone weathering has thus moved from an interest in the natural environment to a concern with built heritage which is evident in this volume.

The clear dilemma is that, of course, stone does exhibit weathering. The questions are whether we should try to preserve a crumbling heritage or to renew the work, as has been done at Wells Cathedral, parts of King’s College Chapel in Cambridge and elsewhere. Such a dilemma is not the traditional remit of geomorphology, so it is good to see Laing and Urquhart in this book writing of heritage value systems and their interrelationship with financial, social and aesthetic values, although it is evident that there are no easy answers.

Traditionally geomorphologists might have presented their data on rates of decay and then sat back, handing over their results to the rest of society to make what it will of them. It is good to see geomorphology engaging with the implications of its findings and at least attempting to follow through to the management options and the likely outcome of various courses of action or inaction. Cleaning, for example, is a practice deeply rooted in value systems. At last we might be making contact with human geographers with interests in the urban landscape and social values. As such, this volume deserves readership not only from the stone weathering buffs but also more widely from urban geographers interested in architecture, heritage and a sense of place.

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INCISED RIVER CHANNELS: PROCESSES, FORMS, ENGINEERING AND MANAGEMENT edited by Stephen E. Darby and Andrew Simon, John Wiley, Chichester 1999. No. of pages: ix+442. Price: £ 75.00 (hb). ISBN 0-471-98446-9

Incised river channels produce some of the most dramatic fluvial landforms and provide evidence of landscape disturbance. Growing recognition and understanding of channel incision over the last two decades has stimulated increased research into this important area of fluvial geomorphology. This book is a compilation of 15 chapters dealing with different aspects of incised river channels. An impressive collection of authors has been assembled covering a broad range of key topics. The book is divided into three main sections: an introduction (two papers); a section

on processes, forms and incised channel evolution (nine papers); and a section on engineering and management of incised rivers (four papers). Three comprehensive and useful indexes (Author, Geographical and Subject) are provided at the end of the book.

Because this project started life as a book, the structure, balance and format of this volume is clearly more cohesive than those of many conference proceedings. The approach is unashamedly geomorphological and this is justified in the introduction. The editors are also at pains to point out the limitations of the book. For example, rills and gullies, headcuts, channel initiation, regional-scale denudation and tectonically active environments are not covered in detail. This list could be extended to include other aspects of incised channel behaviour (alluvial fan incision) or different environments (supraglacial channel incision), but the scope

of the book is comprehensive enough to include the majority of key topics.

Simon and Darby, the editors, in chapter one provide a concise and useful introduction, carefully linking together the various contributions as well as providing a review of past work. The scope, purpose and structure of the book are clearly specified. Schumm in chapter two outlines the main causes and controls of channel incision. This is wholly appropriate given that Schumm *et al.* (1984) published the pioneering work *Incised Channels: Morphology, Dynamics and Control*.

The aim of the second section of the book is 'to promote understanding of incised channel evolution in a range of environments' (p. 13). 'Environment' here is clearly taken to mean both geographical and process environments because the coverage jumps from semi-arid to humid and from headwaters to floodplain lowlands. Furthermore, the aim of this section could have been restated: 'to promote understanding of incised channel evolution in a range of environments *and at a variety of scales*'. A large range of space and time scales is considered from the particle scale of sorting and degradation of mixed grain sizes to river basin response; and from fluctuations in bedload transport rates to evolution over the Quaternary. Mentioning variety is by no means a criticism, as the wide range of studies merely reflects the importance of these rivers and the different approaches required to study the processes and morphology of incised channels.

The third section of the book summarizes approaches which use knowledge of incised river channel geomorphology in engineering and management settings. These specific contributions highlight a more general trend in river engineering, aimed at minimizing intrusive erosion-control measures and promoting more sympathetic management strategies which try to address the underlying cause of incision, rather than merely to treat the problem. This is illustrated with a variety of European and North American examples.

The target audience for this book is primarily academics; advanced level students studying fluvial geomorphology and river engineering; and practitioners interested in incised river channels. This seems wholly appropriate given the style and level of the material. The production quality of the diagrams and photographs (including eight coloured figures) is generally excellent. A few figures would have benefited from redrafting. Overall this is a good book. Whether it is read in its entirety or dipped into for individual chapters there is much to be learnt from this volume. The theme is of sufficiently broad interest that it should be popular; however, the price will ensure it will be largely restricted to library shelves. It is well worth having in a library collection next to Schumm *et al.* (1984) and perhaps Dalrymple *et al.* (1994) *Incised-Valley Systems: Origin and Sedimentary Sequences* which provides a sedimentary perspective on incised river systems.

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#### REFERENCES

- Dalrymple RW, Boyd R, Zaitlin A (eds) 1994. *Incised-Valley Systems: Origin and Sedimentary Sequences*. Society of Economic Paleontologists and Mineralogists, Special Publication No. 51.
- Schumm SA, Harvey MD, Watson CC 1984 *Incised Channels: Morphology, Dynamics and Control* Water Resources Publications, LLC, Englewood, Colorado, 220 pp.

GLOBAL ENERGY AND WATER CYCLES edited by K.A. Browning and R.J. Gurney, Cambridge University Press, Cambridge 1999. No. of pages: 292. Price: £ 50.00. ISBN 0 521 56057 8

This collection of reviews treats an important aspect of climate, and a growing subject of current research. It is timely, having arisen from a conference in only July 1994. It charts the observed route of water, from evaporation to condensation, via cloud properties in solar and terrestrial wavelengths, to precipitation, to the ocean. There are consequences for the contrasting stratification of the ocean in terms of temperature and salinity. Over land the water path is traced through hydrological pathways and vegetation. The remaining energy cycle is completed through solar and terrestrial wavelength radiative pathways and convection of sensible heat.

Use is made of conventional station data, mainly from the 1963–75 campaigns, through special campaigns, to global

satellite data up to the present. Some aspects of numerical models are reviewed and data acquired through such models are compared with the observations.

Many experts are needed to cover this extensive field and one consequence is the wide variety of presentations and of attitudes. It is refreshing to see the differences between the pure scientist, the atmospheric modeller and the more applied scientist, but there are disadvantages to the specialist approach. There are too many acronyms, but there always are in everyone else's work. More importantly, almost nobody simplifies anything. We nearly always finish up in what I call the stomata trap: all the water evaporated by a plant must pass through these tiny holes; therefore we must understand the mechanism of the guard cells that govern how much they open. That to my mind is like saying that the number of people in the audience depends on how many go through the door, yet how many people want to see the play after reading the review does matter, and this overall consideration may be what the specialist can really contribute.